

Having described the invention, what is claimed is:

1 1. A ball ramp actuator for use as a locking mechanism, the actuator comprising:
2 a first cam plate having at least one groove providing a non-circumferential ball
3 ramp;
4 a second cam plate rotatable with respect to the first cam plate, and having at least
5 one groove providing a non-circumferential ball ramp, the ball ramp of the second cam
6 plate intersecting with the ball ramp of the first cam plate when viewed axially;
7 a ball positioned between the first and second cam plates, in the grooves of the first
8 and second cam plates; and
9 biasing means for biasing the ball radially to ensure that the ball follows the non-
10 circumferential ball ramps of both cam plates in response to relative rotation of the two
11 cam plates.

1 2. A ball ramp actuator according to claim 1, wherein the grooves become
2 shallower as they extend radially outward such that radially outward movement of the ball
3 spreads the cam plates apart.

1 3. A ball ramp actuator according to claim 1, wherein the biasing means
2 comprises a ball retainer in contact with the ball and having resiliently deformable portions
3 that serve as integral springs.

1 4. A ball ramp actuator according to claim 1, wherein the biasing means
2 comprises a ball retainer with a pocket within which the ball is located.

1 5. A ball ramp actuator according to claim 1, wherein the biasing means
2 comprises a ball retainer with a flexible arm in contact with the ball.

1 6. A ball ramp actuator according to claim 1, wherein the biasing means
2 comprises a ball retainer with a concave surface in contact with the ball such that the ball is
3 centered with respect to the ball retainer.

1 7. A ball ramp actuator according to claim 1, wherein the biasing means
2 comprises a ball retainer made of an elastically deformable polymer.

1 8. A ball ramp actuator according to claim 1, wherein the number of balls is three.

1 9. A ball ramp actuator according to claim 1, wherein the number of balls is more
2 than three.

1 10. A ball ramp actuator according to claim 1, wherein the grooves include at least
2 one spherical recess to provide a detent for maintaining the ball in a locked or unlocked
3 position.